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A new species of *Platythyrea* from Dominican amber and description of a new extant species from Honduras (Hymenoptera: Formicidae)

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A new species of *Platythyrea* from Dominican amber and description of a new extant species from Honduras (Hymenoptera: Formicidae). - Two new species of *Platythyrea* are described in this paper. *P. pumilio* sp. n. is described from a single worker in Dominican amber. *P. lenca* sp. n. is based on three workers from the Recent Honduran fauna. Among the eight Recent and the three fossil Neotropical *Platythyrea* species known to date, the fossil *pumilio* shares with the Dominican amber *scalprum* Lattke the small size, the incrassated fore femora and the fore basitarsi with a seta opposite to the strigil, and with the extant Brazilian *exigua* Kempf the elongate head, the flat eyes and the minutely denticulate mandibles. The Honduran *lenca* sp. n. is very similar to the Costa Rican *prizo* Kugler. *P. lenca* and *prizo* share the elongate body, the narrow frontal lobes and the serrate mandibles; this latter character is also present in the fossil *P. dentata* Lattke.

Keywords: Hymenoptera - Formicidae - *Platythyrea* - Dominican amber - fossil - extinction - new species - Honduras.

INTRODUCTION

The genus *Platythyrea* is represented by eight Recent and three fossil species in the New World (see the literature review by Bolton, 1995 and Lattke, 2003). All New World *Platythyrea* species are very similar to each other (Kempf, 1964; Brown, 1975). Nonetheless, Kempf (1964) described *Platythyrea exigua* from Brazil and stressed it distinctness. *P. exigua* is characterized mainly by its small size, elongate head and armed petiole. Brown (1975) described *Platythyrea zodion* from Ecuador stating that this species, together with *exigua*, are the sole two distinct New World species. *P. zodion* Brown is easily differentiated from all the other species by its small size, unarmed petiole and head longer than broad. Kugler (1977) described another peculiar Costa Rican *Platythyrea*: *P. prizo* which differs from all other American species mainly by its serrate mandibles, narrower frontal lobes and slender appendages. Kugler (1977) added that *prizo* appears to belong to the Old World *clypeata* group of Brown (1975). His attribution to the *clypeata* group is due to the fact that *P. prizo* shares with the

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members of this group similar frontal lobe structure, mandible shape, dentition, trunk shape and palpal formula. Wilson (1985a) and Baroni Urbani (1995) record the presence of *Platythyrea* in Dominican amber without giving further details. Lattke (2003) described three new species of *Platythyrea*, *dentata*, *procera* and *scalprum* from Dominican amber. According to Lattke (l. c.), the dentate mandibles of *dentata* are also found in *prizo* Kugler, but this character should be plesiomorphic since *dentata* is smaller, possesses hind coxae dorsally dentate and the anterior clypeal margin straight instead of convex. Lattke (l. c.) compared *P. procera* and *P. scalprum* with *P. exigua* Kempf and *P. zodion* Brown.

MATERIAL AND METHODS

The following specimen of *Platythyrea* was examined in one amber sample from the Dominican Republic, deposited at the Museum of Comparative Zoology, Harvard University, Massachusetts, USA.

The MCZC *Platythyrea* specimen has been numbered by myself as MCZC-37. The numbers 1 to 24 were already used for MCZC amber material in de Andrade & Baroni Urbani, 1999 and the numbers 25-35 in Baroni Urbani & de Andrade, 2003. The number 36 was used for a *Cyphomyrmex* gyne (de Andrade, 2003).

MCZC-37 (Fig. 1). A small dark orange sample 1.1 x 0.8 cm containing a worker of *Platythyrea* and impurities. The preservation condition of the ant is good.

The Recent *Platythyrea* examined for this study are deposited in the following collections, given here with the relative coden as it will be used in the following text: MCZC. Museum of Comparative Zoology, Harvard University, Massachusetts, USA. Courtesy Stefan P. Cover. NHMB. Naturhistorisches Museum of Basel, Switzerland. Courtesy Dr Michel Brancucci and Dr Daniel Burckhardt.

Measurements and indexes used in the text are defined here as:

HL	Head length: the maximum measurable distance between the medial margin of vertex and the antero-medial margin of clypeus with the head in full frontal view.
HW	Head width: maximum head width behind the eyes with the head in full frontal view.
EL	Eye length: maximum length of the eye.
SL	Scape Length: length of scape shaft, excluding the basal condyle.
HBaL	Maximum length of hind basitarsus measured on its external face.
HTiL	Maximum length of hind tibia measured on its external face.
HFeL	Maximum length of hind femur measured on its external face.
FFeL	Maximum length of fore femur measured on its external face.
FFeW	Maximum width of fore femur measured on its external face.
WL	Weber's Length: diagonal length of mesosoma from the anterior pronotal border (excluding neck) to the distal edge of the propodeal lamellae.
TL	Total Length: combined head length in full face view (closed mandibles included), Weber's length of mesosoma, petiole length (in profile) and length of gaster (in profile).
CI	Cephalic index: (HW/HL) x 100
SI	Scape index: (SL/HL) x 100
FFeI	Fore Femora index: (FFeW/FFeL) (100)

DESCRIPTIONS

Platythyrea pumilio sp. n. Fig. 1

Material. Holotype worker from Dominican amber, labelled: MCZC-37, in the MCZC (see section Material and Methods).

FIG. 1

Platythyrea pumilio sp. n. Holotype worker from Dominican amber: head in dorsal view (top), and profile of the whole specimen (bottom). Distance between two scale bars 0.1 mm.

Etymology. From the Latin substantive *pumilio* = dwarf, pygmy, referring to the small size of this species. It is used here as a noun in apposition.

Diagnosis. A *Platythyrea* species, known from the worker only, sharing characters with the workers of *P. scalprum* Lattke and *P. exigua* Kempf, but differing from both by the declivous propodeal sides lamellaceous and by the much less pronounced postero-median petiolar convexity, from *scalprum* only by the head narrower and by the petiole shorter and higher, and from *exigua* only by the fore femora broader, by the lack of metacoxal tooth and by its smaller size.

Description. Worker. Head elongate, slightly less than 2/3 longer than broad, with subparallel sides. Vertexal margin medially concave. Vertexal angles slightly protruding posteriorly and subround. Frontal lobes far from each other and gently rounded. Clypeus declivous anteriorly, with truncate anterior border and weakly differentiated from the frontal lobes posteriorly. Eyes large, about 1/4 of the head length and placed dorso-laterally on the anterior half of the head. Mandibles subtriangular. Masticatory margin of the mandibles with 7-8 minute, irregular denticles followed by an apical one. Mandibular sulcus superficially impressed. Palpal formula 3,2, the Mandibular palps not surpassing the postero-medial rim of buccal cavity. Scapes much shorter than the vertexal margin. First funicular joint slightly longer than broad. Funicular joints 2-10 slightly broader than long. Last funicular joint about as long as the sum of joints 9-10.

Mesosoma in profile elongate. Pronotum in dorsal view with barely distinguishable humeri. Pronotal suture impressed. Posterior third of the propodeal dorsum gently declivous posteriorly. Sides between basal and declivous propodeal faces subround. Sides of the declivous face with a lamella reaching the propodeal lobes.

Petiole longer than broad. Anterior face of the petiole in dorsal view weakly convex medially and weakly angulated latero-ventrally. Posterior face of the petiole in dorsal view poorly convex medially and unarmed laterally. Postpetiole slightly shorter than first gastric segment.

Fore femora strongly incrassate. Fore basitarsi with a seta opposite to the strigil. Hind tibiae slightly shorter than hind femora. Hind basitarsi slightly shorter than 1/3 of the tibiae. Mid and hind tibiae with paired, pectinate spurs. Tarsal claws with preapical teeth.

Sculpture. Integument opaque. Head, mesosoma, petiole, postpetiole and gaster densely and finely reticulate-punctate and with sparse, minute, superficial foveae. Legs minutely punctate, the punctures more superficial than in the other body parts.

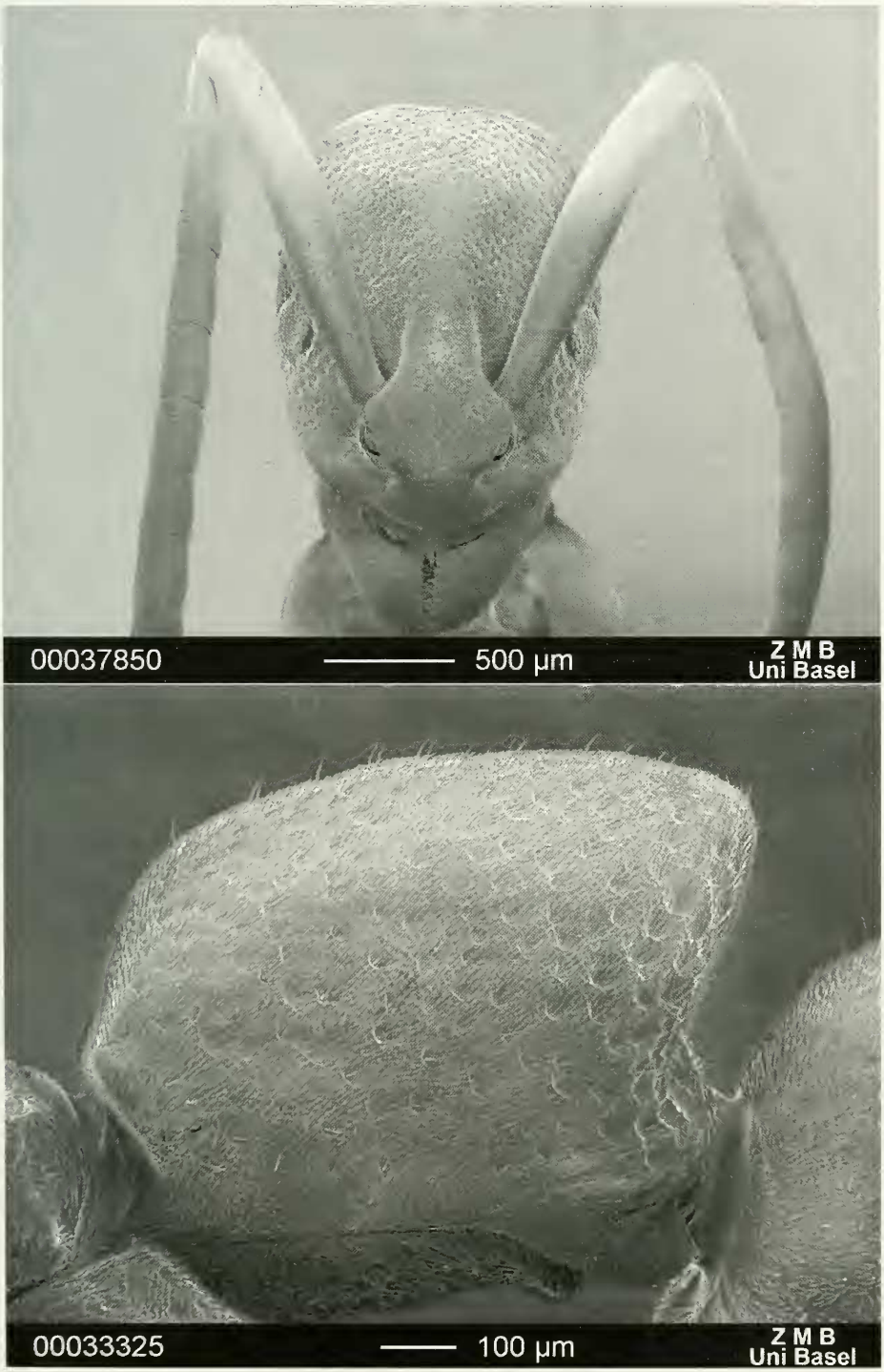
Body densely covered by very short, thin hairs. Apex of the gaster with long hairs.

Colour. Light brown.

Measurements in mm and indices. TL 3.82; HL 0.75; HW 0.46; EL 0.18; SL 0.44; WL 1.24; PeL 0.45; HFeL 0.59; HTiL 0.57; HBaL 0.41; FFeL (left) 0.54; FFeW (left) 0.25; FFeL (right) 0.59; FFeW (right) 0.25; CI 61.3; SI 58.6; FFeI (left) 46.3; FFeI (right) 42.5.

FIG. 2

Platythyrea lenca sp. n. Paratype worker from Honduras (4 km SW Mina El Mochito, Depto. Santa Barbara): head in dorsal view (top), and profile of the petiole (bottom).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Platythyrea lenca sp. n. Figs 2 & 3

Material examined. Holotype worker from Honduras, labelled: 4 km SW Mina El Mochito, 1040 m, rotten wood Forest ravine, Depto. Santa Barbara, HONDURAS 14 March 1979, WL Brown; 2 paratype workers same data and collection as the holotype, all in the MCZC.

Etymology. This species is named after the Lenca, an Indian tribe from Honduras. The name is used here as a noun in apposition.

Diagnosis. A *Platythyrea* species, known from the worker only, similar to *P. prizo*, but differing from it by the erect hairs on the petiole, postpetiole and gaster longer and denser, by the legs longer, by the eyes smaller and by the scapes longer and narrower.

Description. Worker. Head slightly elongate and less than 1/3 longer than broad, with weakly convex sides. Vertexal margin weakly concave medially. Vertexal angles round. Frontal lobes close to each other and rounded. Clypeus swollen medially. Anterior border of the clypeus bearing a convex semitransparent lamella. Eyes small, about 1/7 of the head length and placed dorso-laterally close to the midline of the head. Mandibles subtriangular. Masticatory margin of the mandibles with 9 teeth followed by an apical one. Mandibular sulcus superficially marked. Palpal formula 4,4, palpi not surpassing the posteromedial rim of buccal cavity. Antennae long and slender. Scapes surpassing the vertexal margin by about 0.32 mm when directed posteriorly. First funicular joint more than half longer than broad and slightly longer than the following joints 3-10. Second funicular joint about 1/4 longer than the first joint. Funicular joints 3-10 longer than broad. Last funicular joint slightly longer than the first joint.

Mesosoma elongate in profile. Pronotum in dorsal view with barely distinguishable humeri. Pronotal suture impressed. Propodeal dorsum gently declivous posteriorly. Area between basal and declivous propodeal faces gently concave and each side with a small obtuse tooth. Declivous propodeal face marginate. Propodeal lobes rounded.

Petiole about 1/3 longer than broad. Anterior face of the petiole in dorsal view medially weakly concave and latero-ventrally superficially angulate. Posterior face of the petiole in dorsal view tumuliform medially and unarmed laterally. Postpetiole in dorsal view broader than long and shorter than the first gastric segment.

Fore femora weakly incrassate. Hind tibiae about 1/8 shorter than hind femora. Hind basitarsi about 1/7 shorter than the hind tibiae. Mid and hind tibiae with paired, pectinate spurs. Tarsal claws with preapical teeth.

Sculpture. Integument opaque. Head, mesosoma, petiole, postpetiole and gaster densely and finely punctate and with small, superficial foveae, the foveae more impressed on the petiole, fainter and sparser on the gaster. Legs minutely punctate.

Body densely covered by very short, thin hairs. Petiole, postpetiole and gaster with erect, sparse hairs. Apex of the gaster with long hairs.

Colour. Ferruginous-brown with slightly lighter antennae and legs.

Measurements in mm and indices (3 specimens examined). TL 7.72-8.38; HL 1.68-1.74; HW 1.16-1.22; EL 0.25; SL 1.52-1.60; WL 2.60-2.64; PeL 0.82-0.86; PeW 0.56-0.60; HFeL 1.78-1.84; HTiL 1.54-1.64; HBaL 1.32-1.42; FFeL 1.56-1.64; FFeW 0.37-0.39; CI 69.0-70.1; SI 90.5-92.9; FFeI 23.7.

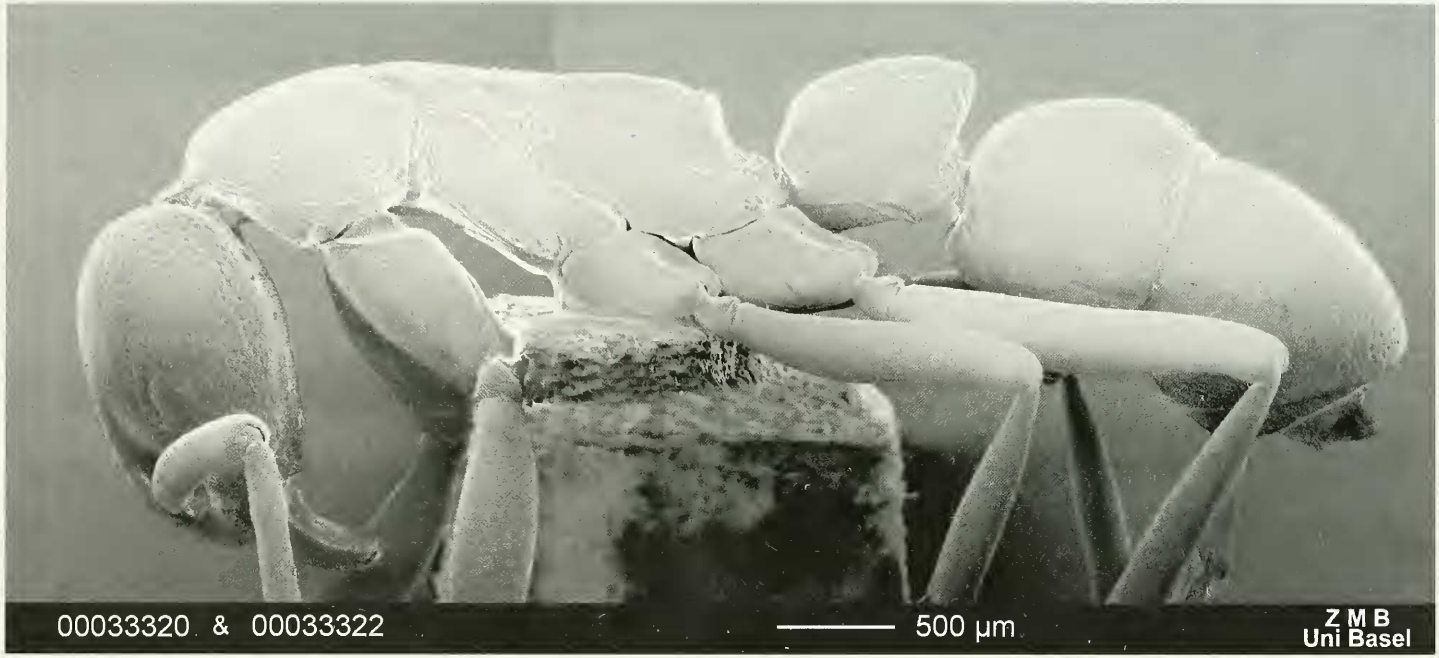

FIG. 3

Platyhyrea lenca sp. n. Paratype worker from Honduras (4 km SW Mina El Mochito, Depto. Santa Barbara): profile of the whole specimen.

Platythyrea prizo Kugler Figs 4, 5 & 6

Material examined. COSTA RICA: Heredia, OTS, La Selva field Station, Puerto Viejo de Sarapiquí, Río Puerto Viejo, 5.III.1973, 10°26' N-83°59' W, 3 workers (paratypes numbers 73-292, 73-295, 73-299), J. Wagner & J. Kethley [MCZC].

Complement to biometry:

Measurements in mm and indices (3 specimens examined). TL 7.65-8.22; HL 1.64-1.68; HW 1.18-1.22; EL 0.30-0.32; SL 1.42-1.46; WL 2.56-2.72; PeL 0.83-0.86; PeW 0.58-0.60; HFeL 1.68-1.72; HTiL 1.48-1.56; HBaL 1.24-1.36; FFeL 1.52-1.58; FFeW 0.39-0.41; CI 71.1-72.6; SI 86.6-86.9; FFeI 25.6-26.3.

IDENTIFICATION KEY FOR THE NEW WORLD *PLATYTHYREA*

The following identification key to the workers of *Platythyrea* from the New World, including all known extant and fossil species, is based on Brown's (1975) key for this genus modified to include the species described afterwards by Kugler (1977), Lattke (2003) and myself (present paper). *P. dentata* Lattke, known on the gyne only, is not included in the key, although it may probably be separated from the known worker-based species with a reasonable degree of confidence (see note below). Longino (2003), in a web document, states that the mandibular sulcus, used by Brown (1975) to differentiate *P. sinuata* from *P. pilosula*, shows a high degree of variation in most Costa Rican *sinuata* and, as a consequence of this, treats *sinuata* as a junior synonym of *pilosula*. This proposal is accepted in the key below, even if the source can not be considered a publication for nomenclatorial purposes.

1 HW (eyes included) > 0.90 mm 2
- HW (eyes included) < 0.90 mm 7
2 Mandibles with teeth 3
- Mandibles without teeth 4
3 Erect hairs on petiole, postpetiole and gaster sparser and shorter. EL ≥ 0.30 mm . . . . . *prizo*
- Erect hairs on petiole, postpetiole and gaster denser and longer. EL = 0.25 mm . . . . . *lenca*
4 HW (eyes included) > 1.4 mm. EL > 0.45 mm. Fore basitarsi with 3 setae opposite to the strigil . . . . . *strenua*
- HW (eyes included) < 1.4 mm. EL < 0.45 mm. Fore basitarsi with 1 or 2 setae opposite to the strigil 5
5 Profemur strongly swollen (W/L > 0.38) . . . . . *angusta*
- Profemur less tick (W/L < 0.38) 6
6 Petiolar node > 0.85 mm long. Petiole about 1/4 longer than broad. Fore basitarsi with 2 setae opposite to the strigil . . . . . *pilosula* (= *sinuata*)
- Petiolar node < 0.85 mm long. Petiole about as long as broad or slightly longer than broad. Fore basitarsi with 1 seta opposite to the strigil . . . *punctata*

FIG. 4

Platythyrea prizo Kugler. Paratype worker from Costa Rica (Heredia, La Selva field Station, Puerto Viejo de Sarapiquí. Río Puerto Viejo): head in dorsal view (top), and profile of the petiole (bottom).


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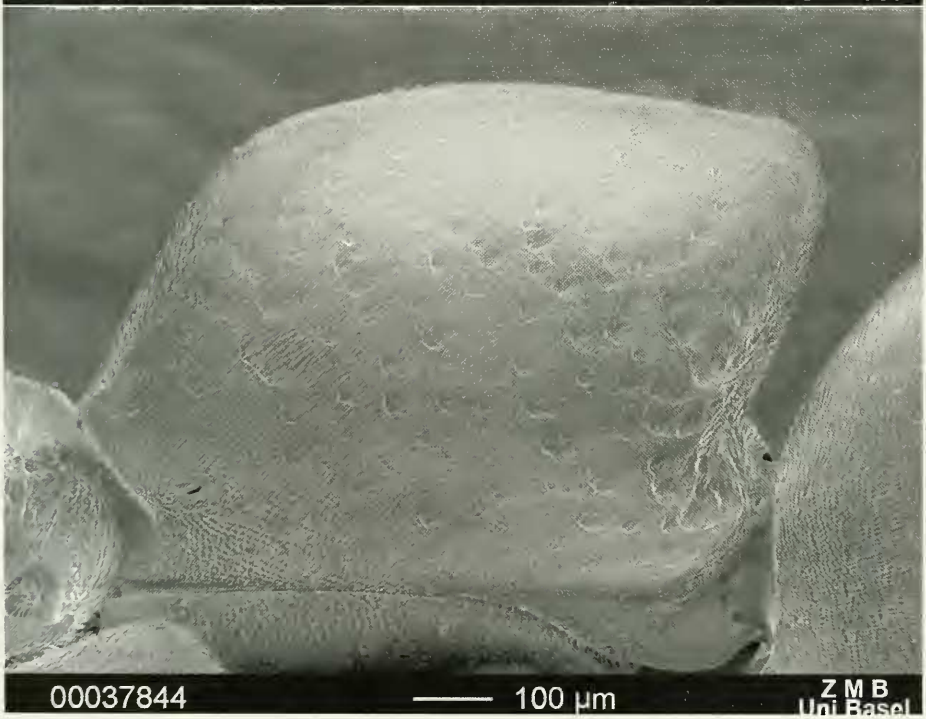
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FIG. 5

Platythyrea prizo Kugler. Paratype worker from Costa Rica (Heredia, La Selva field Station, Puerto Viejo de Sarapiquí, Río Puerto Viejo): profile of the whole specimen.

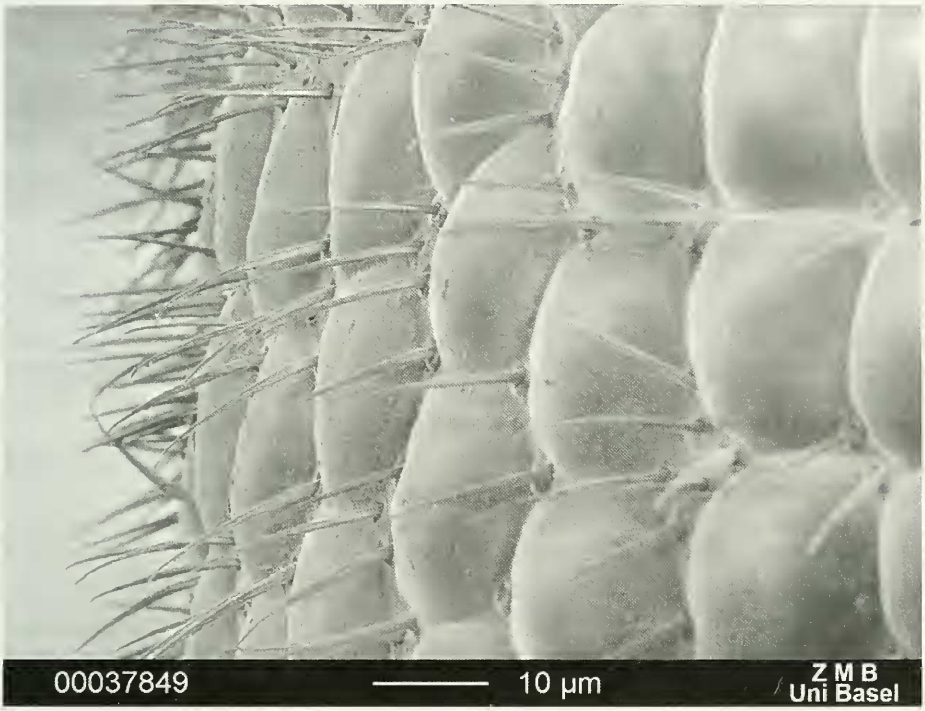

FIG. 6

Platythyrea prizo Kugler. Paratype worker from Costa Rica (Heredia, La Selva field Station, Puerto Viejo de Sarapiquí, Río Puerto Viejo): left eye showing interommatidial pilosity.

7 Metacoxal dorsum with a tooth. Posterior margin of petiolar node as seen from above with lateral corners produced caudad as short, blunt teeth or angles. Clypeus dorsally swollen ..... *exigua*

\- Metacoxal dorsum unarmed. Posterior margin of petiolar node with at most weakly armed lateral corners. Clypeus dorsally flat 8

8 Scapes reaching the vertexal margin. TL = 5.9 mm. SI > 70 ..... *procera*

\- Scapes much shorter, not reaching the vertexal border. TL < 5.0 mm. SI < 60 . 9

9 Head elongate, about 1/3 longer than broad. CI < 63 ..... *pumilio*

\- Head shorter, about 1/7 longer than broad. CI > 80 10

10 Petiolar node elongate (W/L 0.67). Profemur swollen (W/L 0.47). TL < 4.0 mm ..... *scalprum*

\- Petiolar node shorter (W/L 0.86). Profemur less thick (W/L 0.41). TL > 4.8 mm ..... *zodion*

Note. The original description of *P. dentata* Lattke, known on a sole gyne from Dominican amber, gives HW 0.87 mm (eyes excluded). According to Lattke's drawing the HW of this specimen (eyes included, to render it comparable with the figures given by Brown (1975) should be about 0.93 mm. By using the key to the workers above, the gyne of *P. dentata* falls to couplet 2 (mandibles with teeth) where it can be easily differentiated from both other two species, *prizo* and *lenca*, by the hind coxae dorsally dentate and by the anterior clypeal margin straight instead of convex.

DISCUSSION

P. pumilio, described in this paper, and *scalprum* Lattke are the smallest *Platythyrea* known to date from the New World. *P. pumilio* shares with the Dominican fossil *P. scalprum* Lattke the fore basitarsi with a seta opposite the strigil and the swollen fore femora, but it differs from it mainly by the petiole shorter and higher and by the head much narrower. *P. pumilio* shares with the Brazilian *P. exigua* Kempf the head elongate and narrow with flat eyes on the anterior half of the head and by the masticatory margin of the mandibles minutely denticulate. *P. pumilio* differs from the Brazilian *exigua* mainly by its lack of metacoxal teeth, by its fore femora broader, and by its posterior petiolar face unarmed. *P. pumilio* shares with the Ecuadorian *zodion* Brown a similar petiolar shape, but it differs from it by the head much longer and by the size smaller. *P. pumilio* shares with the other Dominican fossil, *procera* Lattke the propodeal declivity with a lamella and the lack of metacoxal teeth. *P. pumilio* differs from *procera* mainly by its smaller size.

P. lenca is very similar to *prizo* but the characters listed under the diagnosis of *lenca* allow to distinguish both species. Since the two species are allopatric, one can not exclude that they may represent geographic variants of the same species. *Lenca* and *prizo*, moreover, are the sole known Recent New World *Platythyrea* with narrow frontal carinae and truly denticulate mandibles. The biometric and pilosity differences between the two, however, supported by our current understanding of *Platythyrea* variability, render improbable the geographic variation hypothesis. Lattke (2003) described from Dominican amber *P. dentata*, another species with denticulate mandibles. *P. dentata* Lattke differs from *prizo* Kugler and *lenca* mainly by its smaller size, by the hind coxae dorsally dentate and by the anterior clypeal margin straight instead of convex. Lattke (2003) considered the sharing of the denticulate mandibles of his fossil species with the Recent *prizo* as a plesiomorphic character since there are significant differences between the fossil and the Recent species.

With the description of *P. pumilio* the number of fossil *Platythyrea* from Dominican amber increases to 4. The sole two known Recent species on the Island of Hispaniola are *P. strenua* Wheeler & Mann and *P. punctata* Smith. The presence of four fossil and two extant *Platythyrea* species on the island of Hispaniola is a further confirmation, if necessary, of the major role played by local extinction as opposed to invasion from other sources in shaping the contemporary. Hispaniolan fauna. Interpretation of this phenomenon is a hot spot in biogeographic research. If, on one hand, all ant species recorded from Dominican amber are extinct, every published record of Dominican amber ants can be considered as proof in favour of extinction. On the other hand, a famous, widely cited, paper by Wilson (1985b) emphasizes the role of invasion and migration over the one of extinction in shaping the contemporary Hispaniolan fauna. The apparent discrepancy between the known composition of the amber fauna and Wilson's conclusion is easily explained by the fact that Wilson's (l. c.) analysis is conducted at genus and not at species level. Baroni Urbani (1995) showed that local extinction plays the dominant role also at generic level and that local extinction and not invasion of new taxa is, hence, the most important factor that shaped the present Caribbean fauna. This argument, as far as I know, was supported again only by de Andrade & Baroni Urbani (1999) and the remarks above are added to reply an

anonymous referee who suggested that there are other cases of references to extinction in the Dominican amber fauna.

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